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EXPLORING THE ROLE OF COMMUNITY PHARMACISTS IN DRUG INTERACTIONS: A CROSS-SECTIONAL STUDY IN PALESTINE

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Objective: *This study aims to evaluate community pharmacists' knowledge, attitudes, and practices about drug-drug interactions (DDIs) and drug-food/herbs interactions (DFIs) in Palestine.* ***Method:*** *A cross-sectional study using a self-administered questionnaire including thirty questions was conducted among community pharmacists to assess the pharmacists' knowledge, attitudes, and practices related to DDIs and DFIs. The t-test, ANOVA, and chi-square tests were used to find the associations with characteristics and demographics. The data were analyzed using SPSS version 22.* ***Results:*** *A total of 361 participants completed the questionnaire; most participants (49.6%) have bachelor's degrees in pharmacy and 26.0% have a doctor of pharmacy degree. 20.8% of participants have been a pharmacist for ten years or longer, while 10.2% have been a pharmacists from 7 to 9 years. Pharmacists' DIs knowledge level was acceptable; their DFIs knowledge was higher than their DDIs knowledge. Pharmacists with long experience working in chain pharmacies with internet services significantly had better knowledge about DDI and DFI. Pharmacists' attitude toward the importance of recognizing DIs was positive, whereas their practice reflected less positivity.* ***Conclusion:*** *Community pharmacists in Palestine have acceptable knowledge of drug interactions. However, their DFIs knowledge is higher than their DDIs knowledge, and they have favorable attitudes toward DIs, whereas their practice was negative. However, community pharmacists need to improve their knowledge of DDIs and DFIs and stay current with new drug interactions.*

Keywords: *Drug-drug interaction, Drug-herbs interaction, Pharmacists Knowledge, Palestine*

INTRODUCTION

Globally, there is an increasing prevalence of polypharmacy. As a result, patients taking multiple medications simultaneously which put the patients at a greater risk of drug interactions. Clinically significant DIs impact patient therapy outcomes, and patient safety, leading to adverse effects, disease complications, and increased mortality rates[1]. Furthermore, causes treatment failure, hospitalization, and increased health care costs[2,3]

There are three types of drug interactions: drug-drug interactions (DDIs), drug-food/drinks/herbs interactions (DFIs), and drug-disease interactions (DDS)[4]. DDIs such as co-administration of isosorbide mononitrate with sildenafil can lead to severe interaction by dropping blood pressure excessively[5]. Concomitant use of alcohol and metronidazole can cause a disulfiram-like reaction as a DFI[6]. DDSIs, such as over-the-counter decongestant drugs with hypertension because these drugs cause blood pressure elevation by narrowing blood vessels[7]. The effect of drug interactions can have a fast onset within 24 hrs of administration, or it can be delayed to more than 24 hrs[8].

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DDIs are widespread and affect a large number of people. For example, according to research conducted in family medicine clinics in Mexico, 80 percent of patients have prescriptions with one or more interacting drugs, and 3.85 of patients have already been prescribed interacting drugs[9]. However, the interaction severity varies and can range from mild to moderate to severe and may lead to death[10]. A study conducted in 2018 in Penang General Hospital, Malaysia, to explore the role of health care providers revealed a lack of knowledge about drug interactions and emphasized the pharmacist's role in preventing these interactions[11]. A study in Saudi Arabia aimed to evaluate the community pharmacist's knowledge about drug-drug interactions revealed inadequate knowledge about drug-drug interactions[12]. In addition, a similar study in Lebanon showed a wide gap in community pharmacy knowledge about DDIs and DFIs [13]. A study conducted in Brazil to measure the prevalence of drug interaction in different practice settings revealed that 70% of potential drug interactions occurred in the intensive care unit[14].

In Palestine, studies have shown a high prevalence of drug interactions in different practice settings. For example, the prevalence of potential DDIs among hospitalized patients in internal medicine departments and in surgical departments in Palestinian hospitals were recently shown to be 66.1% and 56% respectively[15,16]. Furthermore, one more Palestinian study was carried out in 2015 to estimate the potential drug-drug interactions among Palestinian hemodialysis patients; it has been shown that 89.1% of patients had at least one potential drug-drug interaction[17].

Community pharmacists' knowledge, attitudes, and practices toward DIs do not appear to have been adequately studied in Palestine. Therefore, this study aimed to evaluate Palestinian community pharmacists' knowledge, attitudes, and practices about drug interactions to improve the quality of drug prescribing and dispensing.

METHODS

Study Design and Sample Size

A cross-sectional observational study was conducted in Palestine from Dec. 13, 2021, to May 31, 2022. A self-administered questionnaire was distributed to pharmacists who work in licensed community pharmacies in the occupied Palestinian territories.

The sample size was calculated by the Raosoft sample size calculator website[18] using 5286 pharmacists (The total number of licensed pharmacists in the occupied Palestinian territories obtained from Palestine Pharmacists Syndicate) .Therefore, the calculated sample size was 359 pharmacists. The calculator relied on a 5% margin of error and a 95% confidence level for sampling calculation.

Study tool

A questionnaire and interview questions (in Arabic and English) were extracted from a previously published report with minor modifications[13]. In addition, modifications were made to the questionnaire by the research team to be adapted to the Palestinian setting. Ten pharmacists were requested to complete the translated questionnaire and comment on its clarity, construction, and appropriateness. Some improvements were made to the final Arabic draft according to their recommendations.

The final questionnaire contains three sections related to pharmacists' attitudes, practices, and knowledge about drug interactions. The first section included 15 questions relating to participants' demographics including professional status, educational level, year of graduation, university of graduation, experience in a pharmacy, and approximate working hours per week.

The second section consists of 8 questions, five expressed the pharmacist's attitudes and practices toward drug interactions, and the remaining questions aimed to find out what sources of information pharmacists use to record, verify and search for drug interactions between each drug, herb, or food.

The last section includes the extent of pharmacists' knowledge about drug interactions. This section included two parts; the first was focused on whether pharmacists believed themselves knowledgeable regarding drug-drug and drug-food/herb interactions. The second consisted of 17 drug pairs and 13 drug-herb/food pairs; the respondents were asked to determine whether there were risks of

interaction between them. Drug interactions in this section were obtained from Pharmacotherapy: A Pathophysiologic Approach, 10th edition, 2017, ED JT DiPiro et al. (McGraw Hill)[19]. Drugs with no interaction were obtained from the drugs.com website [20].

Statistical Analysis

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software version 22. For knowledge questions, the correct answer was given 1 point. The scores were separately calculated by summation of the DDI correct answers with a maximum score of 17 and DFI correct answers with a maximum score of 13. The four questions about attitudes were counted, then recoded as support all, supported some, and none of the respondents did not support any attitude. Regarding the practice questions, the answers were counted and recoded as none or supported at least one positive practice for yes answers. Internal consistency was computed for pharmacists' knowledge and attitude questions and gave an excellent internal consistency (Cronbach's alpha= 0.905, 0.904), respectively. Descriptive analysis, such as mean ± standard deviation, was used to present continuous data, while frequencies and percentages were used to present categorical variables. The Kolmogorov-Smirnov test was used to confirm that the data was normally distributed. The t-test and the ANOVA test were conducted to determine differences in knowledge score means between pharmacists' demographics, attitudes, and practices. Then, a chi-square test was performed to identify the association between pharmacists' attitudes, practices, and demographical variables. The results of the tests are considered statistically significant when a p-value is equal to or less than 0.05.

Ethical considerations

The study and its questionnaire were approved by the Ethical Committee of Birzeit University (reference number BZUPNH 2119). Informed consent was obtained orally from all participants prior to participation. This study complied with the principles of the Declaration of Helsinki. An email was sent to the Lebanese research team requesting approval to use their questionnaire, and the approval was obtained.

RESULTS AND DISCUSSION

Results

Sample characteristics

The questionnaire was distributed among 390 community pharmacists; 361 agreed to participate in this study, with a response rate of 93.6%. In addition, 214(59.3%) were males, the majority of participants were employees (n= 254; 70.4%), 179 (49.6%) had bachelor's degrees in pharmacy, and more than the half (n= 211; 58.4 %) graduated after 2010, 75 (20.8%) of participants have a long experience in pharmacy (more than 10 years). Furthermore, (n=302; 83.7%) have access to a computer in the pharmacy, while (n=316; 87.5%) have an internet connection. **Table 1** presents the demographic data of the participants who completed the survey.

Pharmacists' knowledge regarding drug interactions

The results revealed that out of 361 participants, (n=165; 45.7%), (n= 187; 51.8%), (n= 165; 45.7%) evaluated their own knowledge level, regarding DDI, DFI and DHI respectively, as good knowledge.

However, when calculating the score for correct answers of DFI and DDI questions, the means were 6.8/13 and 8.5/17, respectively, which indicates that pharmacists' knowledge level was acceptable. 3.6% and 3.4% of respondents have excellent DFI and DDI knowledge, respectively. The results showed that pharmacists have higher DFIs knowledge than DDIs knowledge. **(Fig. 1 and 2)**

Pharmacists' attitudes and practices concerning drug interactions

Whith regards to pharmacist's attitude , (n= 310; 85.9%) thought it is the responsibility of pharmacists to check for drug interactions and (n=246; 68.1%), (n=241; 66.8%), (n= 237; 65.7%) believed it is important to check DDI, DFI, DHI respectively. Furthermore, (n= 222; 61.5%) supported all positive attitudes, which indicated that their attitude was positive.

Table 1: Demographic data of study paticipants. (n= 361).

Variable	Categorization	n (%)
Sex	Male	214 (59.3)
	Female	147 (40.7)
Professional state	Employee	254 (70.4)
	Employer	107 (29.6)
Educational level	Bachelor's degree in pharmacy	179 (49.6)
	Doctor of pharmacy	94 (26.0)
	Post graduate degree in pharmacy	31 (8.6)
	Diploma in pharmacy (pharmacist assistant)	57 (15.8)
Year of graduation	>1999	46 (12.7)
	2000-2010	104 (28.8)
	>2010	211 (58.4)
University of graduation	Palestinian universities	302 (83.7)
	Foreign universities	59 (16.3)
Experience in pharmacy	less than one years	32 (8.9)
	From 1 to 3 years	123 (34.1)
	From 4 to 6 years	94 (26.0)
	From 7 to 9 years	37 (10.2)
	10 years or more	75 (20.8)
Pharmacists approximate working hours per week	less than 24 hours	38 (10.5)
	24-34 hours	88 (24.4)
	35-45 hours	98 (27.1)
	46-56 hours	72 (19.9)
	57 and more	65 (18.0)
The pharmacy's approximate opening hours per days	6 hours or less	53 (14.7)
	From 7 to 12 hours	186 (51.5)
	13 hours or more	122 (33.8)
Numbers of employees present on the same shift	1	189 (52.4)
	2	117 (32.4)
	3 or more	55 (15.2)
Approximate Number of patients seen per day	<50	96 (26.6)
	50-149	187 (51.8)
	>150	78 (21.6)
District	Jerusalem	67 (18.6)
	Northern West Bank	37 (10.2)
	Middle West Bank	235 (65.1)
	Southern West Bank	22 (6.1)
Pharmacy location	Big city	124 (34.4)
	City	101(28.0)
	Village	102 (28.3)
	Refugee camp	34 (9.4)
Computer access	Yes	302 (83.7)
Internet connection availability in pharmacy	Yes	316 (87.5)

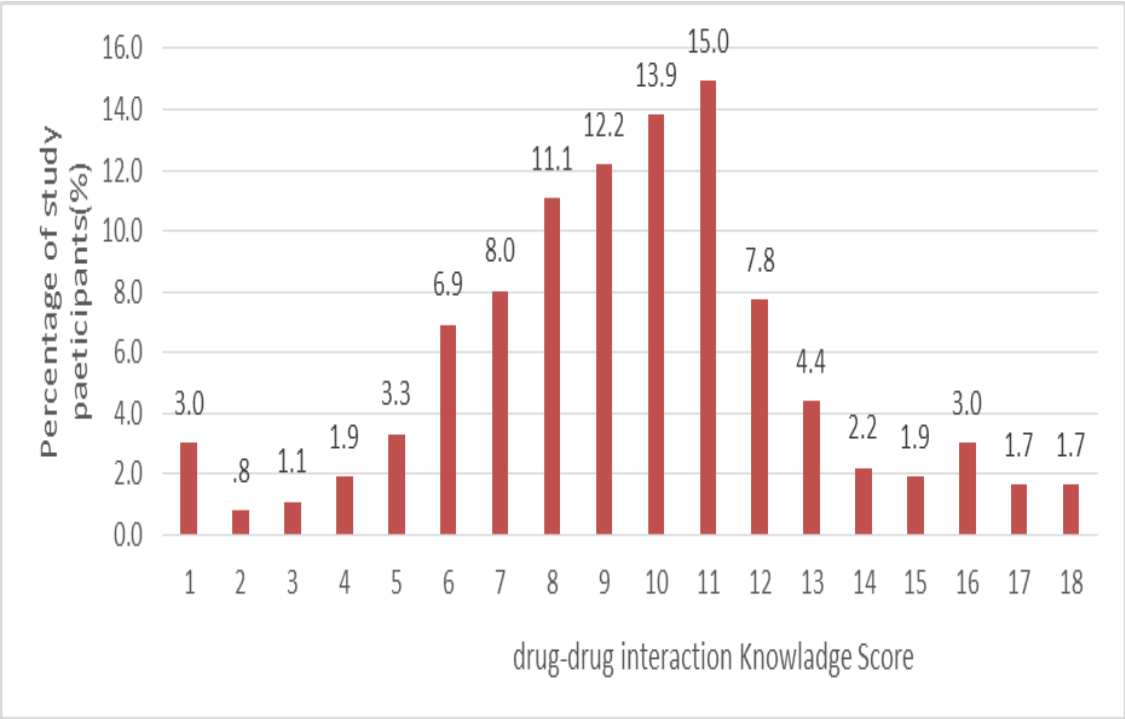

Fig. 1: Percentage of study participants for drug-drug interaction knowledge scores. (N=361) .

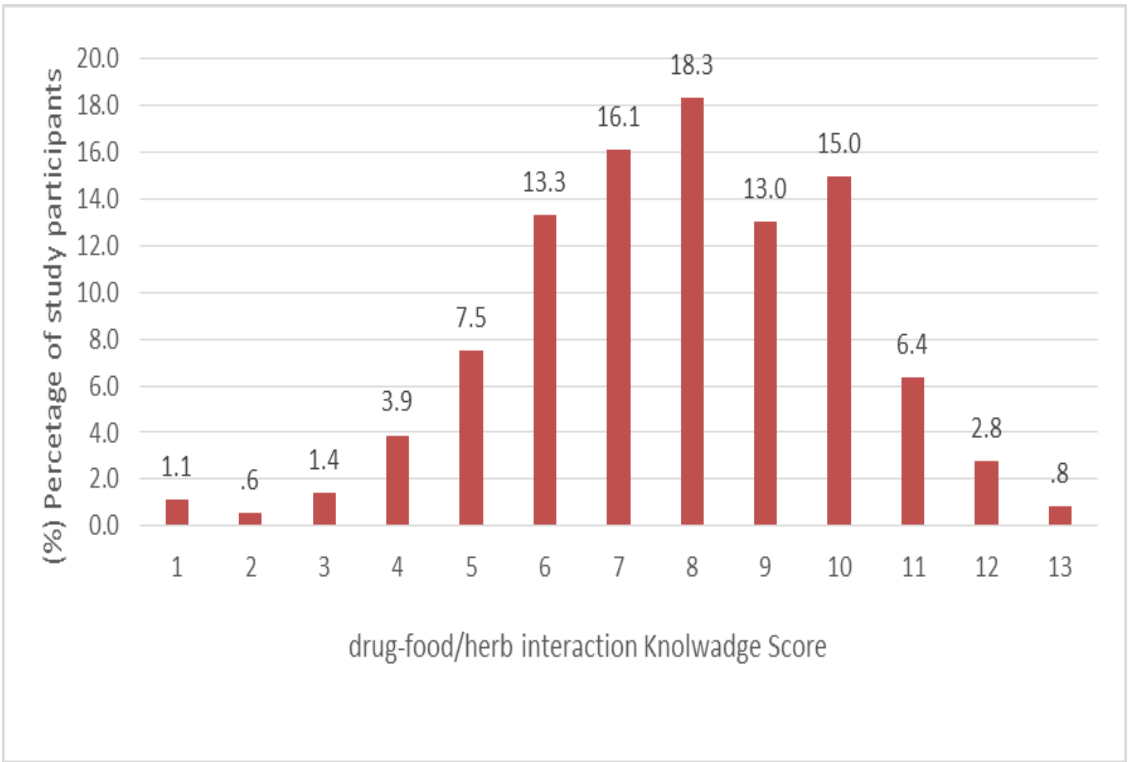

Fig. 2: Percentage of study participants for drug-food/herb interactions knowledge scores. (N=361).

Concerning pharmacy practice, one-third of the participants (n=107; 29.6 %), (n=110; 30.5%) checked for drug interactions and took patient medication history, respectively (Supplementary material – **Figure 2**). Few participants (n= 3; 0.8%) never check drug interactions, (n=3; 0.8%) of them believe it is a doctor job. (Supplementary material **Figure 3**)

Community pharmacists responded differently when they encountered drug interaction during pharmacy practice. Most participants (n= 248; 68.7%) called the prescriber (n=52; 14.4%) did not take any actions and dispensed the prescribed medication, and (n=51; 14.1%) believed it is the prescriber's responsibility to perform drug interactions check upon prescribing. However, only (n=2; 0.6%) support all positive practices **(Figure 3).**

The majority of participants (n=253; 70.1%) use internet or specific website related to drug interactions such as Medscape (n=208; 57.6%), Drugs.com (n=174; 48.2%) and PubMed (n=148; 41.0%). Furthermore, most participants reported knowing how to search for drug interactions using the internet (n=345; 95.6%). (Supplementary material **Figure 4**)

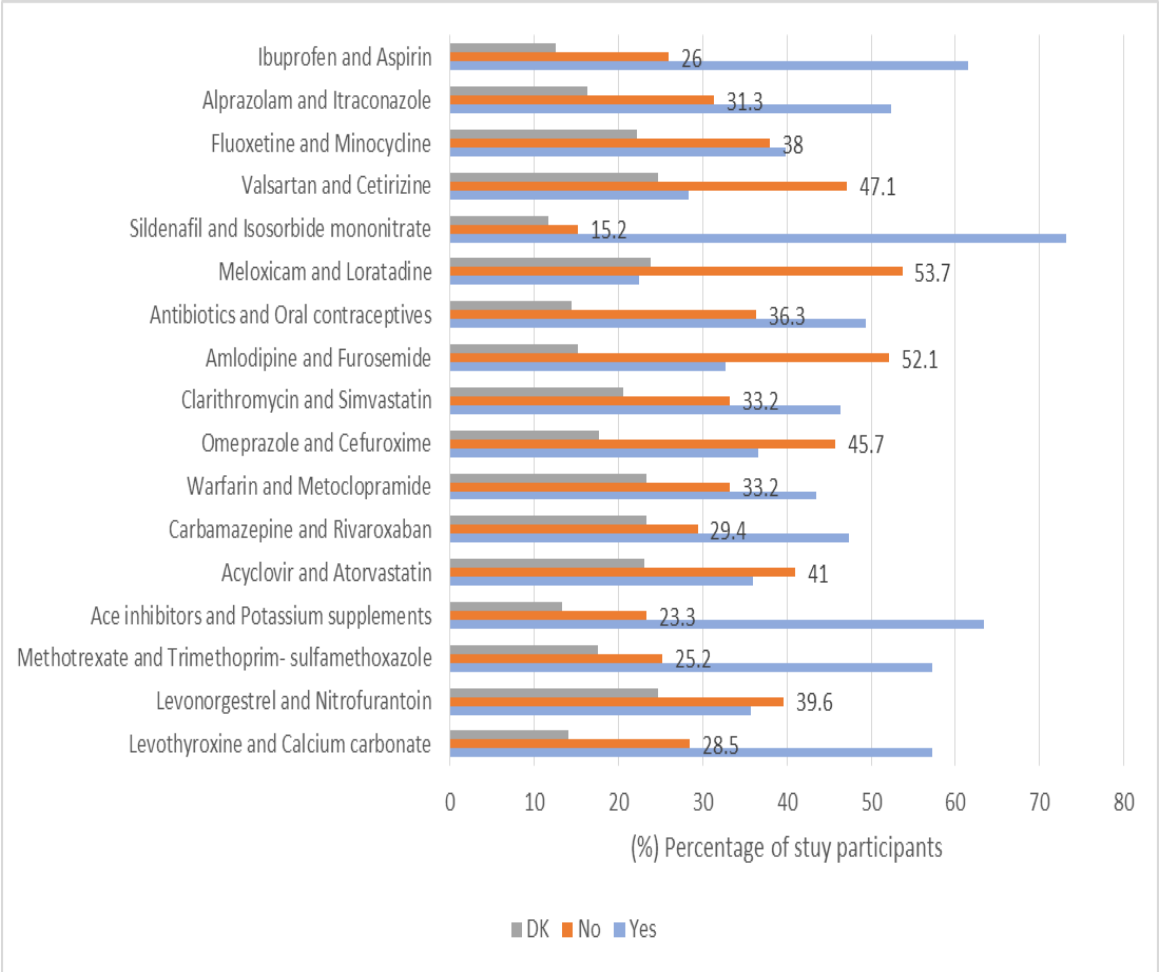

Fig. 3: The knowledge on drug-drug interactions among pharmacists expressed as a percentage of study participant for each question. (N=361).

DK: The community pharmacist does not know if there is a reaction.

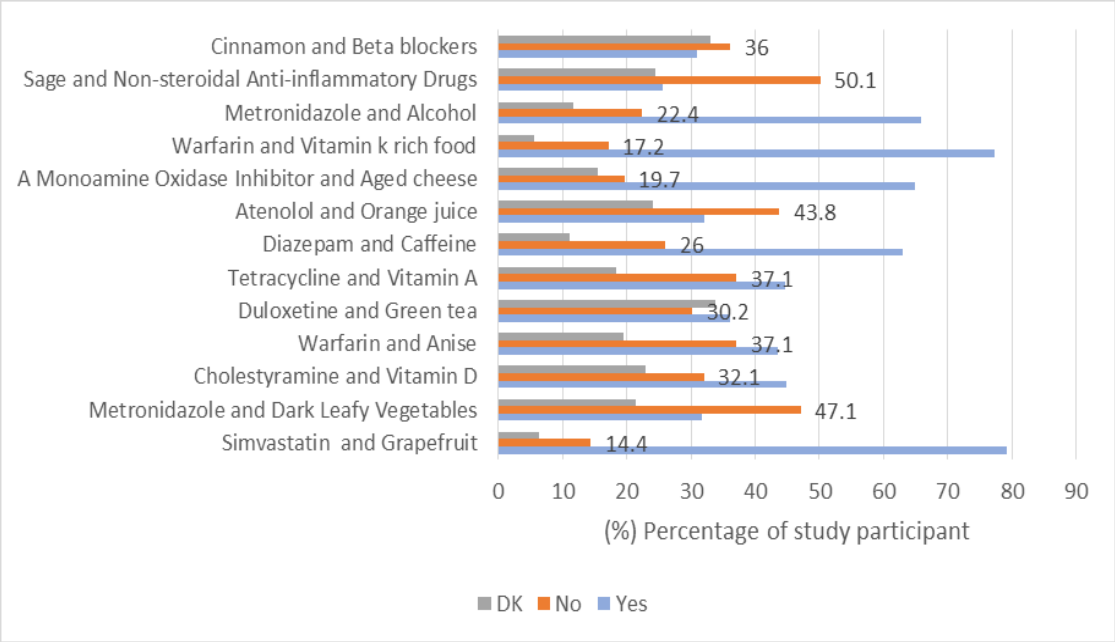

Fig. 4: The knowledge of drug-food/herb interactions among pharmacists expressed as a percentage of study participants for each question. (N=361).

DK: The community pharmacist does not know if there is a reaction.

Association between the demographic data, attitude, and practice with the knowledge level of community pharmacists towards DIs

The results showed a significant association between DDIs participants' knowledge and educational level (P=0.050). Pharmacists with doctor of pharmacy degrees had a higher knowledge level than pharmacist assistants with diplomas in pharmacy **(Table 1).** There is a significant association between DFIs participants' knowledge and their experience (P=0.012); participants with long experience (>10 years) had higher knowledge levels compared to others.

There was a significant association between DFIs participants' knowledge and pharmacists' weekly working hours (P=0.024). Participants who worked less than 24 hrs weekly had lower knowledge levels than others; the majority of participants who worked less than 24 hrs weekly were pharmacist assistants and had a diploma in pharmacy. There is a significant association between DFIs and DDIs participants' knowledge and pharmacy's opening hours per day (P=<.001, P=<.001 respectively), participants who worked in pharmacies opening 13 hrs or more reported higher DFIs knowledge levels compared to others. For DDIs knowledge level, participants who work in pharmacies opening 7 hrs or more reported a higher knowledge level than participants who work in pharmacies opening 6 hrs or less. Furthermore, there was a significant association between DFIs and DDIs participants' knowledge and the number of patients seen per day (P=.024, P=0.031, respectively), participants who saw more than 150 patients obtained higher DFIs and DDIs knowledge levels than participants who saw fewer than 50 patients.

A significant association was found between DDIs participants' knowledge and pharmacy location (P=0.005). Participants who worked in pharmacies located in villages and refugee camps had lower DDIs knowledge levels than participants who worked in pharmacies located in major cities. Furthermore, participants with computer access or an internet connection were more likely to have higher knowledge about DFIs (P=0.045, P =<.001 respectively) and DDIs (P=0.21, P=<.001 respectively). ((Supplementary material – **Table 1**)

The pharmacist who performed drug utilization reviews and collected patient medication history had higher levels of DDIs knowledge. In the study, there was a significant association between DFIs and DDIs participants' knowledge and the frequency of drug interactions checked by pharmacists

(P=<.001, P=<.001, respectively). In addition, there was a significant association between DFIs and DDIs participants' knowledge and the frequency of collecting medication history from patients by pharmacists (P=<.001, P=<.001 respectively), pharmacists who frequently collect medication history have higher DFIs and DDIs knowledge level than others. (Supplementary material **Table 1**).

Chi-Square test results showed that participants with a master's degree in pharmacy and above (77.4%) and with Bachelor's degree in pharmacy (73.2%) significantly had the most supportive positive attitude compared to others (P<0.001). More association results are shown in **Table 2**.

Fig. 3 and 4 show participants' answers to knowledge questions on drug-drug interactions and food–drug interactions among community pharmacists.

Table 2: Association between the demographic data with attitude and practice score of community pharmacists towards drug interactions **(n=361).**

Variable	Categorization	Attitude				Practice		
		Non n(%)	**Support Some n(%)**	**Support all n (%)**	**P-value***	**Non n(%)**	**Support at least one n(%)**	**P-value**
Gender	Male	25 11.7%	55 25.7%	134 62.6%	.864	31 14.5%	183 85.5%	.542
	Female	19 12.9%	40 27.2%	88 59.9%		21 14.3%	126 85.7%	
Educational level	Bachelor's degree in pharmacy	12 6.7%	36 20.1%	131 73.2%	<.001	14 7.8%	165 92.2%	<.001
	Doctor of pharmacy	17 18.1%	33 35.1%	44 46.8%		21 22.3%	73 77.7%	
	Post graduate degree in pharmacy	1 3.2%	6 19.4%	24 77.4%		1 3.2%	30 96.8%	
	Diploma in pharmacy (pharmacist assistant)	14 24.6%	20 35.1%	23 40.4%		16 28.1%	41 71.9%	
The pharmacy's approximate opening hours per days	6 hours or less	9 17.0%	22 41.5%	22 41.5%	<.001	11 20.8%	42 79.2%	.003
	From 7 to 12 hours	26 14.0%	59 31.7%	101 54.3%		34 18.3%	152 81.7%	
	13 hours or more	9 7.4%	14 11.5%	99 81.1%		7 5.7%	115 94.3%	
Numbers of employees present at the same shift	1	24 12.7%	70 37.0%	95 50.3%	<.001	41 21.7%	148 78.3	<.001
	2	12 10.3%	19 16.2%	86 73.5%		8 6.8%	109 93.2%	
	3 or more	8 14.5%	6 10.9%	41 74.5%		3 5.5%	52 94.5%	
Approximate Number of patients seen per day	<50	11 11.5%	28 29.2%	57 59.4%	.005	12 12.5%	84 87.5%	.071
	50-149	29 15.5%	55 29.4%	103 55.1%		34 18.2%	153 81.8%	
	>150	4 5.1%	12 15.4%	62 79.5%		6 7.7%	72 92.3%	
District	Jerusalem	1 1.5%	9 13.4%	57 85.1%	<.001	0 0.0%	67 100.0%	<.001
	Northern West Bank	2 5.4%	3 8.1%	32 86.5%		3 8.1%	34 91.9%	
	Middle West Bank	38 16.2%	81 34.5%	116 49.4%		47 20.0%	188 80.0%	
	Southern West Bank	3 13.6%	2 9.1%	17 77.3%		2 9.1%	20 90.9%	

*Chi-square test was used; the significant value is less than 0.05.

Discussion

Identifying and resolving drug interactions is essential for ensuring the effectiveness of medication safety and saving healthcare costs; this responsibility falls on all healthcare providers. [21]. Moreover, one of the key counseling approaches is to inquire about the patient's drug history, including any OTC drugs, prescription medications, and herbal treatments. Therefore, it is essential to implement workflow processes in any pharmacy setting to increase the pharmacist's knowledge and awareness to prevent significant drug interactions.

The study's findings revealed that community pharmacists in Palestine have an acceptable knowledge about DDI compared to other regional studies in Saudi Arabia, Lebanon, and Jordan., [12,13,22] , even though a study describing the prevalence of DIs in cancer patients in Palestine showed a prevalence of DDIs was 88.1% [23]. This is incongruent with a national study that evaluated community pharmacists' knowledge about the potential DFI, where the results showed they did not have the appropriate DFI knowledge. [24] In the study, pharmacists were aware of their role and responsibility and had a positive attitude toward verifying and preventing drug interactions; these results align with the results of a Lebanese study[13].

The lack of continuing education programs as a part of the pharmacist's licensure renewal process in Palestine could be a barrier to building the competency and skills needed for pharmaceutical care and medication management. However, the study shows that community pharmacists have a good and acceptable level of knowledge about DDI and DFI with more knowledge in DFIs. In a US study to evaluate drug information knowledge retention, the pharmacists' knowledge decreased one year after the educational courses were provided; therefore, continual education is a key to safe pharmacy practices[9]. On the other hand, another American study revealed a significant improvement in the knowledge and score of pharmacists in drug interactions after the educational programs[23].

Pharmacists utilize online resources to check for drug interactions, the most commonly reported website was Medscape. Participants who had access to internet connection reported higher knowledge of DDI and DFI since it was simple for them to check DIs whenever they desired. In a Lebanese study, half of the participants use mobile or online applications, and most use Medscape[13].

Pharmacists have a corresponding responsibility to ensure that drugs are safely prescribed to patients. Therefore, most participants believed checking DDI, DFI, and DHI is essential before dispensing medications. Also, they believe it is pharmacists' responsibility to screen for drug interactions, which shows a positive attitude. These results align with Makkaoui et al [13], and Alrabiah et al[12].

Our findings showed no significant relationship between the knowledge level of DDI participants and district, with pharmacists from Jerusalem and the West Bank having the same level of expertise. The researchers assumed that the pharmacists practicing in Jerusalem would be more aware of DDI and DFI because the region has more sophisticated systems and regulations and more comprehensive monitoring and follow-up. Instead, the results revealed a greater practice level among pharmacists in Jerusalem. This can be a result of Jerusalem's unique regulations and requirements. Furthermore, part-time pharmacists have less experience, reflected in their knowledge and attitude toward drug interactions. In the study, most participants who work in pharmacies that open 6 hrs or less and those who work less than 24 hrs a week showed a lower level of knowledge than others. On the other hand, the pharmacist who works long hours and serves more patients has more knowledge about drug interactions reflecting their extensive pharmacy experience. As a result, they were exposed to more medication dispensing and patient and physician interactions related to medication management.

The pharmacy profession has evolved from a bachelor's degree to a PharmD, post-graduate residency, and fellowship as the pharmacist's role is expanding to offer more pharmaceutical services in different healthcare settings. In Palestine, many programs are offered, including a bachelor's degree in pharmacy, a PharmD, a master's degree, and a 2-year diploma program for pharmacy assistants[25]. The level of education dramatically impacts pharmacist knowledge

and skills in pharmacy practice reflected in our study. Participants with a pharmacy diploma showed the least support for the positive attitude regarding attitudes and educational achievement, whereas participants with master's degrees or more exhibited the most positive attitudes. These findings disagree with the Palestinian study[24] and Jordanian studies[22], which showed no difference in attitudes towards drug interactions between educational levels.

Limitations

This study focused only on DDIs and DFIs, while there are other types of DIs, such as drug-disease interactions, drug-gene interactions, and drug allergy reactions, which may need further research.

Conclusion

Community pharmacists in Palestine have acceptable knowledge of drug interactions. However, their DFIs knowledge is higher than their DDIs knowledge, and they have favorable attitudes toward DIs, whereas their practice was negative. Concerning knowledge, high DDIs knowledge levels were found to be significantly associated with higher education graduates, such as a Bachelor's degree in pharmacy and a doctor of pharmacy degree. At the same time, high DFIs knowledge levels were significantly associated with long experience in pharmacy (>10 years). Furthermore, high DIs knowledge levels were significantly associated with a positive attitude. In addition, high DIs knowledge levels were found to be significantly associated with an increased frequency of checking for drug interactions by pharmacists. Most participants depended on the internet and a specific website and used Medscape. Therefore, community pharmacists must continue to develop and stay current with new drug interactions to become more knowledgeable about DDIs and DFIs and improve their practice toward interactions.

Ethics approval and consent to participate

The study and its questionnaire were approved by the Ethical Committee of Birzeit University (reference number BZUPNH 2119). Informed consent was obtained orally from all participants prior to participation.

Availability of data and supplementary materials

Upon request, the corresponding author will provide the data and supplementary material used to support the conclusions of this study

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نشرة العلوم الصيدليـــة
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استكشاف دور صيادلة المجتمع في التداخلات الدوائية: دراسة مقطعية في فلسطين

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الهدف: تهدف هذه الدراسة إلى تقييم معرفة صيادلة المجتمع ومواقفهم وممارساتهم حول التفاعلات الدوائية (DDIs) والتفاعلات بين الأدوية والأغذية والأعشاب (DFIs) في فلسطين .

الطريقة: أجريت دراسة مقطعية مستعرضة باستخدام استبيان ذاتي الإدارة يتضمن ثلاثين سؤالا بين صيادلة المجتمع لتقييم معرفة الصيادلة ومواقفهم وممارساتهم المتعلقة ب DDIs و .DFIs تم استخدام اختبارات t و ANOVA و chi-square للعثور على الارتباطات مع الخصائص والتركيبة السكانية. تم تحليل البيانات باستخدام SPSS الإصدار ٢٢ .

النتائج: أكمل ما مجموعه ٣٦١ مشاركا الاستبيان. معظم المشاركين (٤٩.٦٪) حاصلون على درجة البكالوريوس في الصيدلة و ٢٦.٠٪ حاصلون على درجة دكتوراه في الصيدلة. ٢٠.٨٪ من المشاركين كانوا صيادلة لمدة عشر سنوات أو أكثر ، في حين أن ١٠.٢٪ كانوا صيادلة من ٧ إلى ٩ سنوات. كان مستوى معرفة التفاعلات الدوائية للصيادلة مقبولا. وكانت معرفتهم بالتفاعلات بين الأدوية و الأغذية أعلى من معرفتهم بالتفاعلات الدوائية. كان لدى الصيادلة ذوي الخبرة الطويلة في العمل في سلاسل الصيدليات مع خدمات الإنترنت معرفة أفضل بشكل كبير حول هذه التداخلات. كان موقف الصيادلة تجاه أهمية التعرف على التفاعلات الدوائية إيجابيا ، في حين أن ممارستهم عكست إيجابية أقل.

الخلاصة: لدى صيادلة المجتمع في فلسطين معرفة مقبولة بالتفاعلات الدوائية. ومع ذلك، فإن معرفتهم بالتفاعلات بين الأدوية و الأغذية أعلى من معرفتهم بالتفاعلات الدوائية ، ولديهم مواقف إيجابية تجاه التداخلات الدوائية المختلفة، في حين أن ممارساتهم كانت سلبية. ومع ذلك ، يحتاج الصيادلة المجتمعيون إلى تحسين معرفتهم والبقاء على اطلاع دائم بالتفاعلات الدوائية الجديدة.